CALIFORNIA STATE UNIVERSITY SACRAMENTO
The Department of Mechanical Engineering

ME196E VEHICLE SAFETY AND CRASH RECONSTRUCTION
SYLLABUS

DESIGNATION: Mechanical Design and Mechatronic Systems

CATALOG DESCRIPTION:

ME196E Vehicle safety and Crash Reconstruction
A course in forensic engineering to study state of the art technology in
vehicle that contribute to passenger safety and stability. Study of seat belts,
airbags and electrohydraulic stabilizers. Application of principles of
dynamics for forensic investigation and reconstruction of vehicle collisions.
Study of the EDR’s (Event Data Recorders), data analysis and verification
with real cases using classical reconstruction techniques and the use of
computer simulations in two and three dimensions. The applications will
range from motorcycles, passenger cars and commercial vehicles. A final
project using real cases is required.

COMPUTER USAGE

The course will provide students an opportunity to study using state of the art
software. Knowledge of SOLIDWORKS or similar software is highly
recommended. Use of WORKING MODEL 2D, SYMWISE4D, ADAMS.

INSTRUCTOR: Prof. José J. Granda
Riverside 5002, 916-278-5711
Email: grandajj@ecs.csus.edu

OFFICE HOURS: Tu – Th 2:00-3:00 pm or by appointment

TIME: 12 pm-1:15 pm.

PLACE: ARC 1014

WEB PAGE: Course documents will be posted on the instructor’s web site.

PREREQUISITE: E110, ME 105

GRADED: Graded Student.

UNITS: 3.0. Lecture three hours.
TEXT: Traffic Crash Reconstruction, Lynn B Fricke Northwestern University, Center for Public Safety


REFERENCE:

- Handbook of Accident Reconstruction by Heinz Burg, Andreas Moser
- Vehicle Accident Analysis and Reconstruction Methods, (R-397) (Premiere Series Books) 2nd Revised edition Edition, Raymond M. Brach (Author), R. Matthew Brach (Author)
  by Barry Strauch (Author)
- Motorcycle Accident Reconstruction and Litigation, Fifth Edition Kindle Edition
  by Paul F. Hill (Author), Kenneth S. Obenski (Author), Jack C. Debes (Author), Eric S. Shapiro (Author)
- Commercial Vehicle Accident Reconstruction and Investigation, Second Edition Kindle Edition by Roy F. Sutphen (Author), Rick W. Varner (Author)
  by Eugene Farber (Author), Paul L. Olson (Author)
- “SOLIDWORKS” User’s manual
- “WORKING MODEL 2D” Users manual
- “SYMWISE4D” User’s Manual
ME196E VEHICLE SAFETY AND CRASH RECONSTRUCTION

COURSE CONTENTS

1. Measuring at the Scene, Drawing after Crash Situation Maps

2. Crash Scene and Vehicle Damage Photography. Photogrammetry for Traffic Crash Analysis

3. Electronic Crash Scene Measurements and After Crash Situation Maps Using Computers

4. Process of Traffic Crash Reconstruction, Causes and Contributing Factors

5. Mathematics and Physics Review, Basic Motion Equations. Understanding Vehicle Behavior in Crashes

6. Drag Factor and Coefficient of Friction

7. Perception and Reaction in Traffic Crashes

8. Speed Estimates for Vehicles That Fall, Flip, Vault or Rollover

9. Momentum Applications

10. Work, Energy and Speed from Damage

11. Steering Overcorrection

12. Use of Event Data Recorders in Commercial Vehicle Crash Reconstruction

13. Use of Event Data Recorders in Passenger Car Crash Reconstruction

14. Reconstruction of Motorcycle Crashes

15. Vehicle Pedestrian Crash Reconstruction

16. Reconstruction of Heavy Truck Crashes